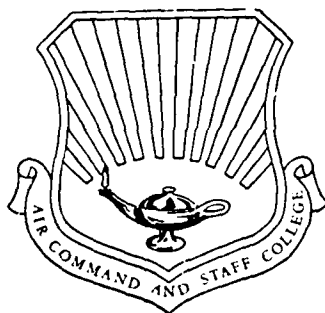


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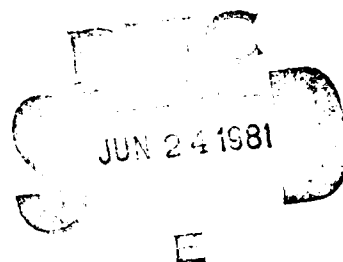
RESEARCH REPORT

NEW TRAINING REALISM

FOR

B-52 CREWS

0780-81



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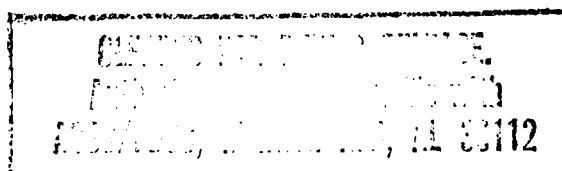
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## **STUDENT RESEARCH REPORT**

**REPORT NUMBER** 0780-81

**AUTHOR** MAJOR BRUCE E. EICKHOFF

**TITLE** NEW TRAINING REALISM FOR B-52 CREWS.

**FACULTY ADVISOR** MAJOR THOMAS BOOTH

**SPONSOR** UNSPONSORED

Submitted to the faculty in partial fulfillment of requirements for graduation.

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20. ABSTRACT Increasing defensive capabilities of potential enemies have required significant changes in the Strategic Air Command's mission and training philosophy since the mid-1970s. Specifically, the command has stepped up B-52 participation in a variety of exercises to improve readiness in both the nuclear and nonnuclear missions. The author discusses the SAC training program in some detail to show how changes in philosophy insure that the aging B-52 will be a viable weapon system during the 1980s.		

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## PREFACE

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The article describes the Strategic Air Command's B-52 training program in some detail to show how recent changes in training philosophy insure that the aging B-52 will remain a viable weapon system during the 1980s. The author has extensive background in the art and science of aircrew training. He was assigned as a T-38 instructor pilot in Air Training Command and gained combat experience in Southeast Asia in EB-66 aircraft. He then served as an instructor/evaluator pilot in a B-52 operational unit followed by assignment to the Directorate of Training at SAC headquarters. There he developed B-52 aircrew training/evaluation programs and assisted in concept development of future B-52 training systems. This article has been submitted to Air Force Magazine for consideration.

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## NEW TRAINING REALISM FOR B-52 CREWS

by Major Bruce E. Eickhoff, Student, ACSC

The Strategic Air Command has made sweeping changes in its training philosophy during the past few years. Particularly affected by these changes are the crews who fly the aging B-52. In an increasingly complex battlefield environment, these crews face far more potential challenges to their airmanship and professional expertise than their predecessors faced in the mid-1970s. To meet these challenges, SAC leaders now emphasize more realistic training at all levels of command operations. Major General Andrew Pringle, Jr., SAC's Chief of Staff, describes the new training philosophy in these words:

Some believe more and better equipment is all that is needed to have an effective fighting force. Often overlooked is the key element of a fighting force--the individual who operates the equipment. The individual must be able to extract the full capability of the machine in order to beat the enemy in his machine. This is why we train hard, why we train often, and why we train the way we will fight.<sup>1</sup>

Parallel with the evolution of a new training philosophy, the command has given top priority to significant technological improvements in the B-52. The offensive avionics system, for example, will increase the accuracy and reliability of the bombing/navigation system. The integration of the cruise missile system will give the B-52G greater employment survivability and flexibility. But the ultimate effectiveness of these improvements will depend heavily on the ability of the crews to operate

the system in the combat environment.

On the other hand, command emphasis on readiness has indeed been timely because these modernization efforts will not be completed until sometime in the mid-eighties. And rapid Soviet modernization of defensive weaponry against the B-52's antiquated technology simply does not justify the luxury of conservative training techniques. A brief review of today's training innovations and some future training initiatives should comfort the skeptics concerned about the effectiveness of the "old BUFF."

#### Exercising the Contingency Missions

The B-52 was originally designed as a high-altitude delivery platform for nuclear weapons, but it has proven its capability in a number of nonnuclear applications, particularly in delivering massive conventional firepower in bombing raids during the Vietnam War. But, after the war, the command sought to rebuild its nuclear capability and refocused B-52 training almost entirely on the traditional nuclear role. During the past three years, however, it has again taken advantage of the B-52's versatility by including both nuclear and nonnuclear roles in its wartime mission.

B-52 "D" model aircraft are used most frequently for non-nuclear operations. Of the three active B-52 models(D, G, and H), the B-52D is best suited for conventional bombing because it has external racks and a reconfigured bomb bay capable of carrying larger conventional payloads than the payloads carried by the newer "G" and "H" models. The B-52D is primarily tasked with the nuclear mission, and the newest of the B-52s, the "H" model,

performs both nuclear and nonnuclear roles.

But in order to use the B-52 effectively in its nonnuclear role, SAC implemented a program of training exercises similar to the exercises used by the tactical air forces to test capability in the actual theaters of potential conflict. One such exercise is BUSY BREWER, a monthly exercise that normally involves short deployments of two or three B-52s to bases in the United Kingdom for flights in the Central European area. From the crew perspective, BUSY BREWER provides the opportunity to plan, brief, and execute B-52 deployment procedures and fly from forward operating bases in the United Kingdom. In addition to participating in European exercises, B-52 crews regularly participate in Pacific theater exercises. For example, in TEAM SPIRIT, an exercise in support of the commander-in-chief, Combined Forces Command, Korea, several B-52D crews from CONUS bases joined crews from the 43rd Strategic Wing based on Guam. Flight profiles used in the exercise allowed the crews to practice nonnuclear tactics that would help sustain contingency operations in the Pacific area.

Recent creation of the Strategic Projection Force expanded SAC's role in worldwide contingency operations. SAC's role is to support the Rapid Deployment Joint Task Force by employing air power over great distances on short notice. Two bombardment wings of B-52Hs at Minot and Grand Forks Air Force bases are tasked for this mission in addition to their primary nuclear mission. The command selected the "H" model B-52 for this role



because of its long-range capability and updated penetration equipment.

To prepare the units for this mission, the command initiated a no-notice exercise nicknamed BUSY PRAIRIE in the last half of September 1980. In this exercise, Minot deployed its B-52Hs to a forward operating base at Whiteman Air Force Base, and forward operations were simulated at Grand Forks. Mobility teams moved quickly to establish a "bare bones" support base at Whiteman in a compressed, 72-hour period. Support crews subsequently launched 68 on-time sorties over three nights of the exercise. The objective of these sorties was to attack three simulated airfields on the RED FLAG range near Nellis Air Force Base. The crews used low-altitude penetration tactics to attack assigned targets with inert weapons while they were under simulated attack from various ground threats and aggressor aircraft.

The short-notice, add-on nature of these exercises places great demands on the time and talents of both aircrews and support personnel. The command's nuclear alert commitment has not diminished, and its resources have not been substantially increased. Obviously, the new training demands require dedicated staffs and maintenance personnel in addition to professional aircrews. Indeed, SAC's crews do "train hard," but rigorous training is only part of the story: they also "train often."

#### Frequent Training to Improve Tactics

Following the Vietnam War, the command entered a period

of severe constraints on B-52 training. First, national policy guidelines for conserving aviation fuel forced marked reductions in flying time. This policy had a significant impact on SAC because the eight-engined B-52 is the largest single consumer of fuel in the Air Force inventory. Second, stepped-up production of crewmembers during the war resulted in large overages of rated officers requiring flight training.

In reacting to these pressures, the command experimented with alternate methods of conducting B-52 training. Earlier training was distributed among formed crews without consideration for differences in proficiency among the six members of a standard SAC crew. This practice resulted in some inefficiency because "older heads" generally needed less training than less-experienced individuals. Thus, in 1975, SAC implemented a training program that emphasized individual requirements and multiple proficiency levels for B-52 crewmembers, but this program soon failed because of cumbersome problems in scheduling and accomplishing widely diverse training requirements.

In July 1976, the command returned to a training concept aimed at meeting the needs of crews as integral units instead of individual crewmembers. The revised concept required all crews to complete training at a level based on their level of proficiency. As a result, unit commanders had the flexibility to allocate scarce training resources to less-experienced crews while maintaining the experienced crews at acceptable proficiency levels. Although the concept improved training flexibility, another scheduling constraint remained.

This problem stemmed from a historical tendency to schedule small numbers of long missions, approximately three missions per month. This practice caused lengthy intervals between flights and posed a potential negative impact on the overall quality of the aircrew force. To alleviate the problem, Lt Gen Lloyd R. Leavitt, Jr., SAC's Vice Commander, proposed increasing the average number of flights per crew from 9 to 12 in a calendar quarter. Although flights would be shorter in duration, crew training would concentrate on key events, such as low-altitude penetration and weapon delivery. The program would provide the benefits of more frequent flights and would also allow greater flexibility to apportion sorties to crews needing more training.

Since additional maintenance resources were not available, operations and maintenance staffs at SAC headquarters devised a procedure for reducing the impact of increased sorties. Supervisors would pick the best of two aircraft launched early in the day for a subsequent sortie. The offgoing crew would brief the incoming crew on the aircraft status while maintenance crews performed minimum servicing functions. The command informally labels the procedure the "cold seat swap " because crews change positions quickly with the engines shut down.

Following tests at Fairchild and Griffiss Air Force bases between September 1978 and February 1979, each unit reported increases in crew coordination and opportunities to accomplish low-level bombing and navigation procedures. Not only did the crews enjoy the less fatiguing shorter sorties but their proficiency also improved from the more frequent repetition of flying procedures and techniques. The success of these tests

led the command to implement the concept among the remaining B-52 units.

Another important change has provided greater diversity in low-altitude training routes. Schedulers traditionally chose routes as near as possible to their units to reduce transit flying time. This constraint deprived crews of essential experience with diverse targets because they attacked the same targets year after year. The command resolved this problem by "pairing" B-52 units to increase the diversity needed in low-altitude training. For example, Blytheville Air Force Base in Arkansas and Fairchild Air Force Base in Washington might be "paired" bases. Crews from each base exchange places once during each calendar quarter and fly a low-level route near the other's base. Missions terminate at the sister base to eliminate wasteful transit time necessary to return home. On a subsequent day, the transient crew plans and flies a return mission, again operating over an unfamiliar low-level route prior to landing at the home station. In addition to the "first look" benefits provided by these flights, crews have the opportunity to work with staffs of different units and operate from unfamiliar airfields.

Although increased diversity and frequency of training have improved overall proficiency, the command has adopted a philosophy that requires crews to "train the way they will fight." To operate under this philosophy, it has realistically structured training to simulate the combat environment to the extent allowed by safety considerations. This carefully structured program requires execution of genuine combat tactics in training exercises.

daily operations, and operational readiness inspections.

### Realistic Training for the Combat Environment

Perhaps the best known example of the training exercises is RED FLAG sponsored by the Tactical Air Command (TAC) and conducted at a military test range near Nellis Air Force base in Nevada. Although TAC crews, for the most part, engage in a wide variety of aerial tactics in a simulated combat setting, the command does not have a monopoly on training opportunities. B-52 crews have participated regularly in RED FLAG since 1976.

RED FLAG rules allow B-52 crews to practice bomber defense tactics under conditions approximating actual combat. For example, the crews frequently engage simulated enemy airborne threats from TAC's aggressor aircraft squadron and initiate appropriate defensive actions. Additionally, simulated enemy ground threats are generated from surface-to-air missile and antiaircraft artillery radars located on the range. These realistic threats test the ability of the crews to react correctly and positively in the bomber's defense.

The exercise also enables crews to practice navigation and weapon delivery tactics at extremely low altitudes. Such training was previously not possible because of environmental restrictions on training routes off-range. Unhampered by restriction, crews flying RED FLAG missions can operate over rugged terrain at altitudes required to penetrate the simulated threats. And the primary payoff for the crew is the improved coordination that results from reacting to the stresses of this demanding environment.

RED FLAG has been so successful that SAC is now participating in a similar exercise in northern Canada, appropriately nicknamed MAPLE FLAG. In this exercise, B-52 crews fly over vast, unpopulated areas covered with thousands of lakes, features largely nonexistent in the United States. MAPLE FLAG also provides opportunities for tactical forces to practice air intercept procedures against the penetrating B-52s.

A third exercise related to the nuclear mission is GLOBAL SHIELD involving the command's entire force of reconnaissance, tanker, and bomber aircraft, as well as its support and staff organizations. Conducted in the summers of 1979 and 1980 and, most recently, in January 1981, GLOBAL SHIELD simulates all facets of the emergency war order (EWO) mission from early stages of preparation through the final stages of execution. (GLOBAL SHIELD 81 also included a contingency portion for the B-52Ds and Hs.) It has been remarkably effective in correcting deficiencies in previously untested plans. After the exercise in 1979, General R. H. Ellis, SAC's commander had this to say:

Initial evaluation of the exercise indicates that all of our objectives were achieved. Everyone had an opportunity to gain valuable training in the performance of our EWO mission and at the same time, to help identify ways to improve our plans and procedures.<sup>2</sup>

This was especially true in B-52 operations. For the first time in many years, for example, large numbers of B-52 crews executed minimum interval takeoff (MITO) procedures. The MITO procedure requires close spacing between aircraft on takeoff to speed departure under attack. Prior to GLOBAL

SHIELD, only two or three aircraft normally were used to practice these procedures. But, during GLOBAL SHIELD, crews used most of the aircraft in their units, more than 20 in some cases, to accomplish the MIFO maneuver. This approach more closely paralleled conditions expected during a wartime launch of the bomber force. The exercise helped not only to identify and correct problems associated with the maneuver but also to improve the confidence and ability of the crews in executing the maneuver.

Another step to improve training realism came in late 1979 with introduction of terrain avoidance (TA) training over mountainous terrain at night. Terrain avoidance is a system that projects a portion of the B-52's radar energy in front of the aircraft during low-altitude flight. The system reflects a radar beam off the terrain ahead and converts it electronically into a "terrain trace." The trace represents an electronic image of the terrain ahead, and it is presented on instruments to the pilot and copilot. Maintaining this trace coincident with a reference line insures a preset altitude above the terrain.

Prior to 1979, the command prohibited TA training over mountainous terrain at night because it was considered an unacceptable risk. Yet skillful execution of this tactic would certainly be required to successfully complete a combat mission. In short, crews would be required to perform a tactic on a wartime mission for which they had no practical experience.

Although crews have always practiced TA tactics over mountainous areas in daytime, night training is beneficial for several reasons. First, the lack of visual cues at night forces crews

to use information presented in the cockpit and rely less on external references to insure safe clearance of the terrain. The increased use of the TA presentation has led to better instrument interpretation and improved TA performance in both day and night training flights. Second, increased dependence on cockpit presentations has prompted crews to evaluate TA equipment more critically, and these evaluations have helped maintenance personnel to analyze and correct system malfunctions. Most important, however, the night tactic has increased the confidence of crews in their ability to accomplish the wartime mission under other conditions that also restrict visibility including adverse weather and use of thermal curtains. (Thermal curtains are used only in combat to cover the window areas to protect the crew from heat and intense light from nuclear weapons.)

Members of the B-52 Combat Crew Training Squadron (CCTS) at Castle Air Force Base noted this improvement shortly after the command authorized the night operations over mountainous terrain. Maj Doug Ellinger, a member of the CCTS standardization/evaluation division, observes:

Since...authorization to fly night mountainous TA, we at the Castle CCTS have noticed a general increase in TA knowledge and interest among pilots and navigators returning for upgrade training. From a vantage point in the Stan/Eval Division, the proficiency and aggressiveness crews demonstrate during TA has shown a remarkable improvement over the last several months.<sup>3</sup>

Encouraged by this success, the command recently lowered the restrictions for minimum altitude in low-level operations (both day and night). Of prime importance, however, is safety.



The tactical squadron commander must formally certify each pilot's proficiency prior to unrestricted flight. This control measure, coupled with much common sense on the part of supervisors and crewmembers, has prevented costly losses of aircraft and crews. The new guidelines do much to satisfy the need for increased realism in daily training operations, but command evaluation policy has also become more realistic.

#### The Role of Operational Readiness Inspections (ORI)

Operational readiness inspections determine the readiness of SAC units to accomplish their wartime mission. Normally, units "generate" all aircraft to full alert status, and crews subsequently fly simulated wartime missions without nuclear weapons. These flights involve low-altitude penetration of a predetermined target area and electronic scoring of simulated releases of nuclear weapons.

Prior to 1979, these releases were scored on the basis of a fixed circular radius from the target. Any score inside this arbitrary circle was a "reliable" weapons delivery. Conversely, any score outside the established radius was considered "unreliable" and counted against a unit's bombing effectiveness. The fixed-circle criterion oriented crew training toward emphasis on reliability at the expense of accuracy.

This arbitrary measurement of bombing capability also had limited value in assessing a unit's combat effectiveness. In actual combat, a large miss distance could produce desired damage to "soft targets," but a large miss distance would

probably cause insufficient damage to "hard targets." The command scoring system now accounts for these variables through the use of statistical tools that measure probabilities of bomb damage against both types of targets. And probabilities are also assigned to other important variables, including pre-launch survivability, weapon system reliability, and effectiveness in defense penetration. The cumulative effect of each variable leads to the final score, damage expectancy, which provides the mathematical probability of success for judging the combat readiness of a unit.

The new scoring system gives SAC commanders a much clearer assessment of crew performance. Former SAC Inspector General, Richard A. Burpee, commented on the effectiveness of the system in these words:

The IG has been using the DE formula for only a year and it is proving a most effective measure of combat readiness. The formula measures total performance beginning with the battle staff and permeating throughout the unit.<sup>4</sup>

The more realistic scoring system is only one change that has improved evaluations of unit capability. Another recent event demonstrates the command's interest in realistic evaluations.

In December 1979, a no-notice deployment of 14 B-52H aircraft from Ellsworth Air Force Base to Guam reflected a dramatic departure from other operational readiness inspections. Previous inspections tested a unit's nuclear mission and were conducted in the continental United States, but the Ellsworth inspection tested the capability of an entire unit to respond rapidly over great distances. Moreover, the B-52 crews practiced nonnuclear

tactics instead of the nuclear procedures normally tested on the ORI mission. And, early in 1980, the remaining three B-52H units subsequently flew similar no-notice deployments to Guam as part of their operational readiness inspections.

Whether they participate in operational readiness inspections, daily training activities, or joint training exercises, today's B-52 crewmembers certainly engage in more realistic training than their predecessors experienced in the mid-1970s. In the process, they have become a force of highly proficient crews capable of performing multiple roles across the broad spectrum of conflict. And these expanded roles have made the B-52 a key player in the modern Air Force.

#### Future B-52 Training

The realistic training philosophy also provides a sound foundation for future training, but this training is costly when one considers the enormous amount of fuel consumed by the B-52. (For example, the fuel consumption rate during a typical low-altitude run is roughly 10 to 15 tons of JP-4 per hour.) The high fuel consumption rate will undoubtedly increase pressures in future years to reduce B-52 training hours as fuel costs rise. For this reason, SAC is actively seeking ways to maintain readiness and concurrently reduce B-52 flying costs.

One program designed to reduce these costs includes the weapon system trainer, a simulator that will be installed at each B-52G/H unit in the early 1980s. Built by the Singer-Link Corporation, the simulator will have three stations duplicating

each crew station in the aircraft. The pilot's station will have six-degree motion and full visual capability, and the navigator and defensive stations can each be used independently or integrally with the other crew stations. The simulator may eventually allow some flying hour savings after it is tested and proven.

The command is also pushing another program that may further reduce the cost to fly the B-52 and simultaneously increase flying training hours for the crews. Under this program, a smaller airplane would be used as a companion trainer aircraft to provide a significant share of B-52 training requirements. With some modification in an "off-the-shelf" business aircraft, SAC crews could practice many basic skills common to the B-52 in a more fuel-efficient aircraft. In feasibility tests of this concept at one of the SAC bases this year, several crews will fly approximately four three-hour sorties a month in a small jet for a year and will fly 25% less in the B-52. After a specified period, monitoring personnel will compare the performance of the test crews with the performance of crews still flying at normal levels in the B-52. If there is no adverse effect on proficiency among the test crews, the Air Force will seek funding to procure a fleet of companion trainers for all SAC's B-52 units.

The command is pursuing another proposal to insure the best use of available B-52 flying time since each flying hour now costs approximately \$5,700. This proposal includes a facility similar to the facility used at the RED FLAG exercise

but on a broader scale for SAC crews. Crews would rotate periodically to a strategic training center for training in combat tactics, both in the classroom and through an intensive flying schedule. The SAC staff frequently refers to this proposed facility as the future "SAC Graduate School of Flying," and it is working hard to establish operational status for the center by FY 1983. The supporting range complex will be operational this year in Montana.

Although these programs promise to reduce the costs of flying the B-52, the readiness of the aircrews cannot be sacrificed. The B-52 is still an effective and battle-proven weapon system, but it is a machine of a former era. Without a programmed long-range bomber to replace it, defense strategists must depend heavily on the ability of SAC crews to accomplish the strategic mission for the next decade. Modernization programs are necessary to insure that the equipment will remain effective against an increasingly sophisticated enemy. Only realistic training, however, can produce effective crews to operate the equipment against the same enemy. The Air Force cannot abandon the gains in readiness reflected in realistic training; it must continue to build on these achievements to insure effective employment of the "old man of airplanes" in any future contingency.

#### FOOTNOTES

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2. Gen Richard H. Ellis, "GLOBAL SHIELD," Combat Crew, September 1972, p. 16.
3. Maj J. Doug Ellinger, "Let's Talk TA/EVS," Combat Crew, XXX, No 5 (1980), p. 4.
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## CONTINUED

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### CONTACTS WITH POTENTIAL PUBLISHERS

1. Major Ted Kluse  
Air University Review  
Maxwell AFB AL

Rejected article--not appropriate for magazine approach

2. Office of F. Clifton Berry, Jr., Telecon, 19Dec 80  
Editor-inChief  
Air Force Magazine

An associate of Mr. Berry suggested I send a copy of the article after cleared for security and content for their review. He indicated the subject may be of interest for Air Force Magazine.

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Draft of the article should be sent to HQ SAC/DOF for review and approval.